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Intelligent Teachers and Intelligence Tests—Do They Agree?

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THE beginning of the twentieth century marked the advent of a new theory in American education—the theory that factors of child growth and development such as personality, interests, attitudes, and intelligence are susceptible of "exact" measurement. The translation of this theory into practice resulted in a growing emphasis on objective appraisal, as evidenced in the controversial standardized-testing movement. It is unnecessary to describe in detail the issues which still center around the use of these tests. Sufficient to say, many persons are convinced that no royal road to educational measurement is to be found in the popular I.Q., P.Q., A.Q., mental age, or any other index used to "measure" the intangibles of intelligence, personality, interests, attitudes, or beliefs. In recent years, many educators have stressed a need for re-examining the rôle of the classroom teacher in the appraisal of these intangibles. While recognizing that improvements continue to be made in the development of standardized tests, these educators maintain that the evidence is not sufficient to relegate the classroom teacher to a minor rôle in the complex task of evaluation.

The study herein reported represents a partial investigation of the validity of the contentions of these persons. Specifically, the study has been designed to reveal the answer to the question: Can teachers make accurate judgments of the intelligence of their pupils? One point should be emphasized here. Whether a teacher makes accurate judgments of intelligence or not, he does make judgments. These opinions may be expressed in informal talks with other teachers, in conferences with guidance and administrative personnel, and even in personal conferences with pupils and parents concerning pupils' future academic and

vocational plans. In many of these cases, the opinions offered are based, not on an intelligence rating from an intelligence test, but rather on information secured from the many contacts teachers have with their pupils in a variety of situations.

There is, of course, no guarantee that, even when using intelligence-test results, the teacher is certain to be working with infallible data. An individual's intelligence quotient on one intelligence test may differ greatly from his intelligence quotient on a second intelligence test, since even the theories of intelligence advanced by the test-makers are not always compatible. In fact, even the same test may yield somewhat widely varying intelligence quotients for the same person on different occasions.

A SURVEY of the literature has revealed some research dealing with the ability of teachers to judge accurately the intelligence of their pupils. One of the first reports is found in a book by L. M. Terman, *The Measurement of Intelligence*, published in 1916. It seems appropriate to discuss this reference briefly, since this early study set the stage for subsequent thought and research on the issue.

Terman, in summarizing the results of a study by Binet to determine the validity of teachers' judgments of intelligence, reported:

1. Teachers do not have a very definite idea of what constitutes intelligence. They tend to confuse it variously with capacity for memorizing, facility in reading, ability to master arithmetic, and so on. On the whole, their standard is too academic. They fail to appreciate the one-sidedness of the school's demands upon intelligence.
2. In judging intelligence teachers are too easily deceived by a sprightly attitude, a sympathetic expression, a glance of the eye, or a chance "bump" on the head.
3. Although a few teachers seem to realize the many possibilities of error, the majority show rather undue confidence in the accuracy of their judgment.[1]

It is interesting to note the evidence used by Binet to justify these conclusions. One source consisted of 40 replies received from teachers in Paris in answer to two questions: "By what means do you judge the intelligence of your pupils?" and

[1] *The Measurement of Intelligence: an Explanation of and Complete Guide for the Use of the Stanford Revision and Extension of the Binet-Simon Intelligence Scale.* Boston: Houghton Mifflin Company, 1916. p. 31.

"How often have you been deceived in your judgment?" His second source of information consisted of having three teachers come to his laboratory to judge the intelligence of children whom they had never seen before. Binet's study is open to strong criticism, particularly in the light of his purposes. Since one of his purposes was to determine the validity of teachers' judgments of intelligence, the important thing was not how they arrived at the judgment, but rather the validity of the judgment once it was made. In addition, the artificial situation in which he asked three teachers (certainly a questionably small number for extensive conclusions) to estimate the intelligence of pupils they had never seen before is open to much criticism. The contrast between his prescribed situation and the normal situation in which the teacher is in contact with the pupil day after day for weeks, months, and even years, is self-evident.

To determine the relationship between the teachers' judgment of the intelligence of pupils and the intelligence-test results for these same pupils, the Pearson coefficient of correlation was used. A correlation of .48 resulted, a figure which Terman considered "moderately high" but not high enough to be significant.

Soon after the appearance of Terman's book, several other reported studies concerning the ability of teachers to judge the intelligence of students appeared. The correlations between teachers' judgments and the results of intelligence tests found in most of these studies were slightly higher than those based on Binet's work, as quoted by Terman. Table I summarizes the results of these early investigations.

Since the year 1924, articles concerned with this problem have not been in evidence in educational literature. It is possible that educators have concluded that the problem, for all practical purposes, has been settled. Apparently they believe the previous studies have indicated that the value to be derived from teachers' estimates of pupils' intelligence is not sufficient to warrant further investigation. The questionable validity of this assumption has been one of the prime reasons for undertaking this investigation. Is the evidence which investigators have presented sufficient to conclude that such estimates are of little practical value? Even if there are errors in judgment (and it should be remembered that these judgments continue

TABLE I

STUDIES IN WHICH TEACHERS' ESTIMATES OF PUPIL INTELLIGENCE ARE CORRELATED WITH INTELLIGENCE-TEST RESULTS

Investigators	Number of Classes	Number of Pupils	Year Reported	Intelligence Tests Used	Correlations Reported
(1)	(2)	(3)	(4)	(5)	(6)
Garrison and Tippett—*					
Grades IV-VIII	5	158	1922	Stanford-Binet	.45
Grades IV-VIII	5	158	1922	Otis Advanced	.61
Averill—†					
Normal-school entrants	.....	59	1923	Otis Group Test	.64
	.....	59	1923	Thurstone	.36
Varner—‡					
Grades III-VIII	11	.....¶	1923	Haggerty Intelligence Examination, Delta 2	.70
Morrison—§					
Grades III-VI	50	1,710	1924	National Intelligence Test, Scale A	.45
Pressey and Long—‖					
Grades not given	31	1,006	1924	Pressey Intermediate Classification Test	.57

* Garrison, S. C., and Tippett, James S. "Comparison of the Binet-Simon and Otis Tests," *Journal of Educational Research*, VI (June, 1922), pp. 42–48.

† Averill, Lawrence A. "A Mental Survey of Fifty-nine Normal School Students: Some Correlations and Criticisms," *Journal of Educational Research*, VII (April, 1923), pp. 331–37.

‡ Varner, G. F. "Improvement in Rating the Intelligence of Pupils," *Journal of Educational Research*, VIII (October, 1923), pp. 220–32.

§ Morrison, J. Cayce. "Correlation of Teachers' Judgment with Intelligence Quotients," EDUCATIONAL RESEARCH BULLETIN, III (January 23, 1924), pp. 25–28, 43.

‖ Pressey, S. L., and Long, Glen S. "A New Idea in Intelligence Testing," EDUCATIONAL RESEARCH BULLETIN, III (December 10, 1924), pp. 365–68.

¶ Number not reported.

to be made), are there not identifiable reasons for these errors—errors which might be corrected to some extent once these reasons are made known? These questions have served as a core around which the present study is designed. From them the following basic purposes have evolved:

1. To determine the correlation between teachers' estimates of the intelligence of pupils and intelligence-test scores (I.Q.'s)
2. To determine possible reasons for differences between teachers' judgments and intelligence-test scores (I.Q.'s)
3. To propose ways in which the combined results of teachers' estimates and intelligence-test scores (I.Q.'s) can be utilized.

IN ORDER to obtain data relative to the first purpose just stated, the co-operation of schools in which intelligence tests had not been given to a sizable number of the pupils was sought. Three schools which met this criterion expressed an interest in the project. Several teachers in each school were asked to record independently their estimates of the intelligence quotients of their pupils on forms provided for this purpose. After the estimates were made, intelligence tests were administered to these pupils and the resultant intelligence quotients were recorded on the provided form. In a fourth school (*see* School D, Table II), intelligence tests had been administered to the pupils, but the test intelligence quotients were not known by several of the teachers. These teachers recorded their estimates of their pupils' intelligence quotients on the provided forms, after which the test intelligence quotients were recorded on them.

In order to ensure a relatively common basis for the estimates to be made by the various teachers, each teacher was given a mimeographed sheet, which is reproduced here, listing interpretations of different intelligence-quotient ranges:

Most teachers are interested in checking as objectively as possible their "hunches" regarding certain characteristics of their pupils. We also are interested from an experimental point of view in having teachers do this. The attached form provides an opportunity to appraise the mental ability of each of your pupils. Certain suggestions for the use of the form are given below.

1. Before the intelligence tests are given, use Terman's classification given below and estimate the intelligence quotient of each child in your room.

Intelligence Quotients	Classification
Above 140	"Near" genius or genius
120–140	Very superior intelligence
110–119	Superior intelligence
90–109	Normal, or average, intelligence
80– 89	Dullness, rarely classifiable as feeble-mindedness
70– 79	Borderline deficiency, sometimes classifiable as dullness, often as feeble-mindedness
Below 70	Definite feeble-mindedness

2. In making your estimate, remember that most paper-and-pencil intelligence tests measure scholastic or academic ability. You can be guided to some extent by the child's actual performance and achievement in your room.

3. Please differentiate by using I.Q.'s, such as 91, 94, 107, etc., as well as the multiples of 5, such as 90, 95, 105, 110, etc. In other words,

try to differentiate between every two pupils as best you can rather than assign the same intelligence quotient to several pupils.

4. Arranging your class in the rank order of their apparent academic ability should be helpful in your estimating. Compare your estimate for each child with the "classification" indicated above.
5. Turn your estimates in to your principal before the intelligence test is given. The principal will then record the test results and send the form to me.

. . . . . .

Participating teachers were asked to use this sheet as a guide in making their estimates. It should be noted, however, that each teacher was asked to give his estimate of the exact intelligence quotient of each of his pupils. In most of the earlier studies teachers had been asked to judge each pupil in terms of ranges of intelligence (for example, "inferior," "average," etc.).

For the four schools, 24 different teachers in Grades II-VIII estimated the intelligence quotients of their pupils in 34 different classes. In all, 763 estimates, representing 579 different pupils, were made. The Pearsonian r was computed to indicate the correlation between each teacher's estimates of his pupils' intelligence quotients and the test intelligence quotients for these pupils. The resulting correlation coefficients are presented in Table II. The mean of these correlation coefficients, .72, is higher than that found in any of the earlier studies which have been reported in Table I. Although the writers can present no supporting data for reasons why the mean correlation is higher than the reported mean correlations in earlier studies, their own impression is that teachers in today's schools have a better understanding of the factors influencing the intelligence quotient than did their predecessors who participated in these earlier studies. The teachers of today are, they believe, less likely to offer snap judgments based on a chance "bump on the head" or other extraneous factors which Binet, for example, believed to be operating in his study.

In all research in which a correlation coefficient is used, the problem of interpretation of this statistical measure arises. The reader might well ask, and probably has asked, "Just what does a correlation coefficient of .72 actually mean?" There is no simple answer to this question. This statistic is commonly used for the purpose of indicating a relationship between two variables; that is, if one variable (the teacher's estimate) is higher

for some pupils than for others, is the second variable (the test score) also higher for these pupils? The extent to which the teacher agrees with the test result on each pupil's intelligence quotient determines the numerical size of the correlation coefficient. That the correlation in this study is not perfect (1.00) indicates that the teacher's judgment and the test results are not in perfect agreement. That the correlation is relatively high (.72) indicates that the teacher's estimates and the test results agree to a high degree, at least to a greater degree than previous studies have indicated.

There is one important factor which is not accounted for

TABLE II

CORRELATIONS BETWEEN TEACHERS' ESTIMATES OF INTELLIGENCE AND INTELLIGENCE-TEST RESULTS FOR PUPILS IN SEVERAL ELEMENTARY GRADES OF FOUR OHIO SCHOOLS*

School and Grades	Number of Classes	Number of Pupils	Intelligence Tests Used	Correlations
(1)	(2)	(3)	(4)	(5)
School A— IV–VI	6	214	California Test of Mental Maturity	.81
School B— III–VIII	10	176	Henmon-Nelson	.72
School C— IV–VIII	11	185	Henmon-Nelson	.72
School D— II, III, VI	7	188	Henmon-Nelson, California Test of Mental Maturity	.64
All schools— II–VIII	34	763	.....	.72

* Includes estimates by 24 different teachers.

when the correlation coefficient is used. If a teacher consistently overestimates or underestimates the intelligence quotient of all his pupils, a high correlation will result. In effect, this has happened in the case of several teachers in this study. For example, one of the highest correlations obtained was .84, although the teacher's estimates were an average 15 I.Q. points below the test scores. The conclusion is simply that while the teacher was able to rank his students quite accurately according to intelligence, his concept of the numerical value for "average," "superior," "below average," and other ratings differed from what the test yielded in terms of intelligence quotients for these qualitative concepts. It should be noted, however, that

even among the various intelligence tests there is disagreement concerning the meaning of any specific intelligence quotient or range of intelligence quotients. Moreover, the relatively high correlation does indicate that the teacher was able to rank his pupils in approximately the same order in which they were ranked according to the test results.

TABLE III

AVERAGE DIFFERENCES BETWEEN TEACHERS' ESTIMATES OF INTELLIGENCE QUOTIENTS AND INTELLIGENCE QUOTIENTS FROM TEST RESULTS FOR OVER-AGE AND UNDER-AGE PUPILS IN THE FOUR SCHOOLS

SCHOOL	UNDER-AGE PUPILS		OVER-AGE PUPILS	
	Number of Pupils	Average Difference	Number of Pupils	Average Difference
(1)	(2)	(3)	(4)	(5)
School A	33	— 5.3*	108	+ .7†
School B	51	— 7.5	51	+4.1
School C	24	— 4.1	48	+ .8
School D	39	—10.0	70	—1.9
All schools	147	— 7.3	277	+ .7

* Negative value indicates that teachers' estimates were an average 5.3 intelligence-quotient points below those for the test for the 33 under-age pupils in School A.

† Positive value indicates that teachers' estimates were an average of .7 intelligence-quotient points above those for the test for the 108 over-age pupils in School A.

IN HIS book, *The Measurement of Intelligence*, Terman states that

> . . . one of the most common errors made by the teacher is the tendency to overestimate the intelligence of the over-age pupil. This is because she fails to take account of age differences and estimates intelligence on the basis of the child's school performance in the grade where he happens to be located.
>
> . . . . . .
>
> The superior child is likely to be a year or two younger than the average child of his class, and is accordingly judged by a standard which is too high.[2]

These tendencies, if true today, would lead to one of the more plausible reasons why teachers' judgments of intelligence are not in close agreement with intelligence-test scores. As a means of verifying the opinions expressed by Terman and thus revealing a possible source of error in teachers' judgments of intelligence, comparisons were made between teachers' judgments of

[2] *Op. cit.*, pp. 25, 26.

the intelligence of both over-age and under-age pupils and test intelligence quotients for the same pupils. In order to ascertain the over-age and under-age pupils in any grade, ranges of "normal" ages[3] for the various grade-levels were established: Those students below the lower normal-age limit for each grade were considered under-age; those above the upper normal-age limit for each grade were considered over-age. An analysis of the intelligence quotients estimated by these teachers for pupils in these two extremes, as presented in Table III, reveals that Terman's original assumption that teachers apparently do not consider the age factor in estimating the intelligence of their pupils is still valid. The intelligence of the older pupil, better adjusted as a result of maturity level, is apparently judged by standards applicable to the pupil of average age. The younger pupil, judged by a standard of intelligence applicable to a pupil of average age, rates lower in intelligence in the teacher's opinion than in the test results.

THE reader may think, at this point, that there is a hidden implication in this study—the implication that since teachers' judgments of pupils' intelligence are as accurate, or at least can be made as accurate, as scores derived from intelligence tests, they should someday replace the intelligence test. Such is not the case. Primarily, the purpose of the study has been to indicate that teachers are more accurate in their estimates of the intelligence of their pupils than is usually believed. In one sense, the results of this study should give the teacher added confidence in the estimates which he invariably makes of the intelligence of his pupils. In another sense, a note of caution, implying that these judgments are far from infallible, merits consideration. Taken together, the preceding statements indicate a kind of interdependence between the teacher's estimates and the test results.

There are several ways, it seems to the writers, in which this procedure of combining teachers' estimates and test results can be helpful to the classroom teacher. The trend in education

[3] Computed on the assumption that pupils entering Grade I must be six years old by January 1 of the school year. Possible ages for entrants on September 1 range, therefore, from five years, nine months, to six years, nine months. Normal ages were considered to range from six years to six years, six months, on September 1. If ages of all entrants are distributed normally, this group would constitute the middle fifty per cent of the class in age. For the second grade, "normal" ages would range from seven years to seven years, six months; for the third grade, from eight years to eight years, six months, and so on.

today is toward more recognition of the teacher as a guidance "specialist." In this capacity he must know each and all of his pupils. One aspect of this knowledge is his ability to distinguish correctly the intellectual capacities of his pupils. It might be beneficial, therefore, for him to estimate the intelligence of each of his pupils (in such terms as the intelligence quotient or mental age) after he feels sure that he knows them but before he actually consults the records for their intelligence ratings. To provide an over-all picture of his ability to judge accurately the "group" intelligence, averages of the test intelligence quotients and the teacher-estimated intelligence ratings could be compared. To some extent this procedure would provide a basis for answering the questions: Am I expecting too much from this class, or am I rationalizing for a class whose achievement "expectancy" in terms of intelligence is perhaps greater than I have estimated?

Of more importance to the teacher should be the information he can deduce from an analysis of individual ratings. An estimated intelligence-quotient rating of 90 compared with a test I.Q. of 130 (an actual case in this study) certainly merits attention by the teacher, and should lead to an investigation of the reasons why this estimate was so much lower than the test indicated the intelligence quotient to be. One of the most common errors in estimation, that of overestimating the intelligence of the older pupils and underestimating the intelligence of younger pupils, may be the reason for wide discrepancies in some cases. There are other possible reasons—basing the estimate on past achievement or personality factors such as attentiveness, home background, need for discipline, loquaciousness, and a myriad of other possible factors. And still another factor could be responsible for the error—the inadequacy of the intelligence test from which the intelligence quotient was obtained!

In recent years increased emphasis has been placed on teacher self-evaluation as a basic step in improving teaching. Unfortunately, techniques for developing this ability are seldom cited. It seems to the writers that the technique described in this study offers excellent possibilities in this area. The teacher, confronted with the results of his estimates of intelligence and the results obtained from intelligence tests, should conceivably be

[*Continued on page 139*]

What Is the Capacity of Your High-School Building?

By M. J. CONRAD

THE question of how many pupils a given secondary-school building will house is a frequent one to which neither the school administrator nor the survey specialist has had an adequate technique of finding the answer. Yet, with secondary schools beginning to face serious school-housing problems, it is extremely necessary to assess accurately the numerical adequacy of existing buildings in order to plan the necessary additional school-plant facilities.

Studies of utilization, although not developed primarily to determine operating capacities of buildings, have long been used to assess the quantitative adequacy of secondary-school buildings. However, studies of utilization, when used to determine operating capacities, have certain major shortcomings. The utilization study is based upon arbitrary standards—standards upon which even authorities do not agree. Since the technique of capacity determination based upon utilization studies not only fails to consider the type of educational program but also fails to consider the degree to which the building is adaptable to the educational program, it gives a distorted picture of the true operating capacity. Moreover, since it is generally agreed that 100–per cent utilization is impracticable, it becomes necessary to set some arbitrary optimal percentage of utilization as the basis for capacity determination. Such an optimal percentage of utilization has never been generally accepted.

Furthermore, it is commonly agreed by most educators and specialists in the school-plant field that school buildings should be planned in terms of the educational program to be carried on in the building. If we accept this basic principle, it follows that the capacity of a given building is a direct function of the educational program to be carried on in it. From this basic principle as a point of reference, the question arises whether an optimal percentage of utilization exists which is applicable to secondary-school buildings in general or whether the optimal percentages of utilization which have been suggested in the past may be no more than the chance relationship of the existing buildings studied to their educational programs.

It should be pointed out at this time that the criticisms which have been made do not apply to utilization studies in general but only to the use of them in determining capacities. In his development of the utilization study, Morphet indicated numerous valid uses, but cautioned against its use as a measure of capacity.[1]

The problem, then, has been to relate capacity to the functional use of buildings, and to develop a technique for determining the practical operating capacity of a secondary-school building in relation to a specific educational program. The basic approach in developing this capacity-determining technique has been a reversal of the well-established school building–planning formulas such as those developed by Anderson[2] and Packer.[3] The fundamental assumption underlying the new approach is that capacity is integrally related to the educational program and policies of each school system rather than dependent upon arbitrary standards applicable to all school situations. This assumption is really a corollary to a long-standing basic principle of school-building planning; namely, that a school building should be planned in terms of the educational program to be carried on in it.

IN ORDER to develop a capacity technique consistent with this basic assumption, it was necessary to analyze the many factors of educational program and policies related to the capacity of secondary-school buildings. The following factors were included in this analysis: number and types of teaching stations, suitability of rooms, size of rooms and number of pupil stations, desirable average class-size, room-assignment policies, nature of the educational program, length and number of periods, staggered schedules, multiple sessions, specialization of rooms, and the complexity of the pattern of subject elections. Many of these factors were found to be so closely related that their effect upon capacity could be accounted for by a single multiple factor. After these various factors had been analyzed to determine their

[1] Morphet, E. L. *The Measurement and Interpretation of School Building Utilization.* New York: Teachers College, Columbia University, 1927. p. 93 (Teachers College, Columbia University, Contributions to Education, No. 264).

[2] Anderson, H. W. *A Method for Determining the Housing Requirements of Junior High School Programs.* Iowa City, Iowa: State University of Iowa, 1926. 56 pp. (Studies in Education, Vol. III, No. 3).

[3] Packer, P. C. *Housing of High School Programs.* New York: Teachers College, Columbia University, 1942. 51 pp. (Teachers College, Columbia University, Contributions to Education, No. 159).

interrelationship and their net effect upon capacity, they were synthesized into the following capacity formula:

$$BC = \frac{TS \times DS \times T \times E}{PP}$$

in which

BC is the building capacity which could be accommodated by existing facilities in a given subject area;
TS is the total number of teaching stations in a given subject area;
DS is the desirable average class size for the particular subject area;
T is the total effective periods of instruction per week in the schedule of classes;
E is the average total school enrollment for a given period of time; and
PP is the average total number of pupil periods of instruction per week in the given subject area for the same period of time.[4]

In order to determine the operating capacity of a building, it is necessary to apply the formula to each subject area separately. This process determines the total school enrollment which could be accommodated in each subject area of the building. The lowest pupil capacity thus obtained for any subject area is the maximum school enrollment which can be housed in the building without modification either of the building or the educational program. When a building is ill-fitted to the educational program, these capacity limits of the different subject areas will vary considerably. In such cases, it is often possible to adapt the excess spaces in those subject areas with high pupil-capacity limits to those areas with low pupil-capacity limits, and thus to increase the total operating capacity of the building.

An analysis of the many factors related to school-building capacity clearly indicated the impracticability of utilizing every room or every pupil station in a secondary-school building every period of the day. Although it would appear that the capacity technique makes no allowance for this factor, such is not the case. The formula does not contain a correction factor as such, but the technique of application of the formula does compensate for the impracticability of using every room and every pupil station every period of the day. Further analysis of the impracticability of 100–per cent utilization showed that the allowances had to be adapted to the individual school situation, and could not therefore be lumped into a single factor and included in the

[4] Conrad, Marion J. "A Technique for Determining the Operating Capacity of Secondary School Buildings." 1952. pp. 56–61. Doctor's thesis on file in the library of Ohio State University.

formula itself. The allowance to compensate for the impracticability of using every pupil station every period of the day is included in several factors of the formula. The greatest single allowance, however, comes from applying the formula to each individual subject area separately.

In view of the fact that the capacity formula contains many factors which are multiple in nature and not readily available to the school administrator, it seemed expedient to develop forms for collecting and processing the raw data. Thus, forms with detailed instructions have been developed which define the step-by-step process of determining the capacity of a secondary-school building and make it relatively easy to apply. These forms and instructions, along with detailed illustrations, are contained in "A Manual for Determining the Operating Capacity of Secondary-School Buildings" which will be available from the Bureau of Educational Research, Ohio State University, on or about June 1, 1953.

ALTHOUGH the capacity-determining technique is primarily one for determining the operating capacity of a secondary-school building for the existing program, the capacity formula does have a number of other uses:

Capacity for Projected Use of Buildings—Since the technique differentiates the many factors of educational program and educational policies of a given school, it is equally applicable in determining the capacity of buildings for some projected use. In these days of changing educational programs, the school administrator may wish to determine the effect which a given change in educational program will have on the capacity of the building, or whether the building will actually house the projected educational program. School authorities may also be considering the merits of a changed daily-program organization or other administrative policy. The capacity of the existing building under the present and changed program organization will furnish the superintendent with valuable additional data upon which to base his final decision. Likewise, the capacity of an existing building can be determined for different types of vertical school organization. A decided difference in the operating capacity of an existing building for junior– or senior–high school purposes may well dictate whether another junior– or senior–high school building is to be built.

Overcrowding—In addition to determining the total operating capacity of an existing building, the new technique determines the subject areas where overcrowding is taking place and measures the degree of such overcrowding. By comparing the subject-area capacities with

projected school enrollments, it is possible to predict when and in which subject areas overcrowding will take place.

Planning School-Plant Improvements—Since the capacity technique establishes the relationship of capacity to educational program and policies, it is useful in the planning of new secondary-school buildings or in the remodeling or enlargement of existing buildings. Although similar, this technique is superior for determining housing requirements, primarily because it recognizes and takes into account the impracticability of 100–per cent utilization.

THIS capacity-determining technique constitutes only one of a series of steps to be taken into consideration in measuring the adequacy of existing secondary-school buildings. Any comprehensive survey of school-plant facilities must include the qualitative aspects of school plant as well as the quantitative ones measured by this capacity technique. It is assumed that consideration has been given to the quality of existing rooms and that the facilities justify their continued use and inclusion as available teaching stations in the capacity study.

Although no formal evaluation has been made of the capacity-determining technique, it has been used in many schools, and the reactions to it which have come from principals, superintendents, school-plant co-ordinators, and special building consultants in the school-plant field who have seen it in operation have been most favorable. Superintendents and principals have generally accepted the building capacity determined by the new formula as the basis for appraising the numerical adequacy of existing school plants and for determining needed additional school-plant facilities. In those cases where the capacity-determining technique indicated that areas of overcrowding existed, there has been no single instance of disagreement on the part of principals or superintendents that such overcrowding actually existed. Superintendents' reactions have been most favorable toward that function of the new capacity technique which permits determination of building capacities under varying conditions of vertical school organization and projected educational programs and policies.

The Survey Division staff of the Bureau of Educational Research has found this new capacity technique very useful in its surveys of school-plant needs throughout the state. For years the Survey staff has made utilization studies of secondary-school buildings in order to estimate their numerical adequacy.

However, it has never been willing to set an operating capacity for an existing secondary-school building on the basis of such studies, but has had to resort to generalities concerning overcrowding or poor utilization. The new capacity technique has obviated this difficulty.

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Reaction to Student Teachers

By HENRY L. ASHMORE

Questions are frequently asked as to how elementary- and high-school pupils react to student teachers, and whether the parents of these pupils really want their children to attend a school where students in training are teaching. The college administrators are usually concerned with this problem, and they are interested regarding the public relations which exist between public-school centers co-operating in the program and the college. The writer has frequently heard it said that parents do not want their children being used as "guinea pigs," or that the average pupil will learn more when under the regular teacher, and many similar remarks. It was only natural that at Georgia Teachers College we were curious as to the answers to these questions as they concerned us and our co-operating centers.

Georgia Teachers College had been using five co-operating centers for a period of two years when we decided to find out what the pupils and parents thought of the program of student teaching. Although we now have eight co-operating centers in addition to the campus laboratory school, only five off-campus centers were in use when we made a survey of opinion in the winter quarter of 1952. We thought our program had been relatively successful since we have had many requests from near-by schools to participate in it; however, we wanted specific reactions. Consequently, we prepared a questionnaire to be sent to all the parents and pupils of each one of the co-operating centers.

Our first step was to seek the aid of the principals of the public schools, the supervising teachers, and the student teachers. With their expressed willingness—indeed, they were very eager to know the results—we began consideration of our questionnaire. We wanted it short, concise, and simple, know-

ing full well the inherent dangers of a complicated form. Basically, we wanted answers to the following questions:

1. Do you enjoy having student teachers in your school?
2. Do you think the school has benefited from having these student teachers?
3. Do you think the pupils (we sent the questionnaire only to the high schools) have benefited from having the student teachers?
4. Have you learned more or less in classes where you had a student teacher?
5. Do you want the school to continue to have student teachers?
6. Why do you like to have student teachers?
7. Why do you dislike to have student teachers?

We finally decided to word these questions substantially the same for the pupils and parents. Obviously, on the parents' questionnaire we left out the fourth question.

The questionnaires were given to all the pupils in the high schools. We received answers from almost all of the pupils. This was accomplished by distributing the questionnaires in home rooms and collecting them as soon as completed. We sent the parents' questionnaires to each parent who had a child in classes directed by student teachers. Approximately 68 per cent of these were completed and returned by the parents.

THE results from the four schools used in the survey follow. The fifth school was included in our plans but the returns have been misplaced; however, the results in this school were substantially the same as the ones given in the following table:

	Total Number	Per Cent
1. Do you like having student teachers?		
Yes	558	90
No	26	4
Don't care	38	6
2. Has the school benefited from having student teachers?		
Yes	502	82
No	30	5
Don't know	81	13
3. Have the pupils benefited from having student teachers?		
Yes	506	83
No	41	7
Don't know	63	10
4. Have you learned more or less under student teachers?		
More	278	48
Less	43	8
Same	256	44
5. Do you want the school to continue the program?		
Yes	539	89
No	21	3
Don't care	51	8

It is noteworthy that the majority of the high-school pupils enjoyed the student teachers (90 per cent), thought the school had benefited (82 per cent), believed the high-school pupils had benefited (83 per cent), and wanted the program continued (89 per cent). It is interesting also that 48 per cent thought they had learned more under the student teachers than under the regular teachers, 44 per cent indicating no difference in learning.

Even more significant perhaps were the answers to Questions 6 and 7 on the pupils' questionnaires. The most frequent answers to the question, "Why do you like student teachers?" are given here:

	Number of Pupils
Pupils receive more individual attention	146
Change of teachers is good	84
Student teachers are friendly and helpful	138
Different and various methods are used	109
They understand us better	63
The instruction is less monotonous	42
They know our problems	38
Student teachers seem more interested in what they teach	33
They have better dispositions than regular teachers	17

Of course, many other reasons were mentioned, but these were given most frequently. The answers to Question 7, "Why do you dislike student teachers?" follow:

	Number of Pupils
The change slows down our classes	23
They give too much homework	16
They disrupt class plans	8
They have favorites	9
They mark too strictly	10
They are uninteresting	4
They confuse me	3

As already stated, the questionnaire for the parents left out the question as to whether the pupils learned more or less under the student teachers. Otherwise, the questionnaire was substantially the same. The results are given in the following table:

	Total Number	Per Cent
1. Do you like having student teachers?		
Yes	149	87
No	2	1
Don't care	21	12
2. Has the school benefited from having student teachers?		
Yes	139	81

No	2	1
Don't know	30	18
3. Have the pupils benefited from having student teachers?		
Yes	137	86
No	3	2
Don't know	19	12
4. Do you want the school to continue the program?		
Yes	146	86
No	2	1
Don't care	22	13

As in the case of the pupils, the vast majority of the parents liked having student teachers (87 per cent), thought the school had benefited (81 per cent), thought the pupils had benefited (86 per cent), and wanted the school to continue the program (86 per cent).

When asked how the school had benefited, the following answers were given:

	Number of Parents
Pupils receive more individual attention	57
They set good examples	23
They are enthusiastic about teaching	34
They encourage pupils to go on to college	8
It is an honor for the school	12
They appear interested in the pupils	19
They relieve the load of the regular teachers	6
They create interest and give variety	14

It is interesting to note that the parents' remarks were similar to those of the high-school pupils. A striking similarity is the fact that both mentioned help for individual pupils and caring for individual differences most frequently. The unfavorable reactions from the parents were as follows:

	Number of Parents
Student teachers are not thorough enough	7
Regular teachers are more efficient	4
High-school pupils do not need so many teachers	3
Student teachers are not conscientious	2
No progress under some	2

As a result of this survey, the college teachers concerned and the principals of the co-operating schools believe we have the answers to our questions concerning the parents' and pupils' attitudes toward the student-teaching program. We have concrete evidence as a result of our questionnaires that the parents and pupils overwhelmingly appreciate the unique contributions of the student teachers toward a school program, and that they are more than willing to continue to help in the ever expanding program of training a professional group of persons to carry on good classroom teaching.

The Survey Division: a Special Report

By ARTHUR W. FOSHAY

For the first time in the history of the Bureau of Educational Research, it has been necessary this year to disappoint the majority of the boards of education who have come to the Survey Division for assistance with their school-building problems. The frequency with which such requests have been denied has, in fact, led to the belief in some quarters that the Bureau is no longer rendering such service. The purposes of this brief announcement are to correct that false impression, to explain the present difficulty, and to describe briefly how the Bureau is trying to remedy the situation.

From the time of its founding about a third of a century ago, the Bureau has made surveys of various kinds for boards of education and other public agencies in Ohio. Exclusive of minor assistance to many districts, the Survey Division has completed approximately 260 surveys since its inception.

Until the Second World War, the number of requests for surveys was small. One professional staff member, with occasional additional help, was able to carry the entire survey load and still have time for the many other duties incidental to membership in the faculties of the College of Education and the Graduate School. This easy pace in the survey field was due in part to the relative newness of the survey approach, but in large part was the result of lack of schoolhouse construction. Low birth rates, depression, and wartime building restrictions kept the volume of schoolhouse construction low and the number of requests for surveys small.

Members of boards of education and school superintendents know full well the change that has occurred since the war. High birth rates have brought large increases in enrollment, and the end is not in sight. In addition to new construction to house this increased number of pupils, there has been, and is, a vast pool of replacement needs resulting from almost two decades of failure to replace outworn and outmoded structures. Since the war, voters have been quite willing to approve bond issues for building purposes, and the total of such approvals in Ohio since the end of the war is approximately $442,000,000.

The increased activity in the field of schoolhouse construc-

tion quite naturally has resulted in an increase in the number of requests for surveys. The Survey Division in 1945 made available to boards of education a new service in the educational planning of specific new buildings. This new service involves working with the school staff to set up educational specifications for the building and collaborating with the architect to see that the desired educational features are actually provided in the plans.

While the pressure in the Survey Division has been mounting steadily for several years, it has been possible until this year to honor all requests for assistance within a reasonable time. This is not true in 1952–53. Last October 1, at the start of the current academic year, the Survey Division had already scheduled enough surveys and building-planning projects for the entire year. In fact, it had committed itself in this field to the point of endangering the opportunities of its staff members to carry on effectively the other activities normally expected of University faculty members.

Since October 1, 1952, about 50 additional requests for assistance have been received. Compare this figure with 260—all the surveys conducted by this Bureau since 1920—and the magnitude of the problem is apparent. In every case it has been necessary to refuse any early assistance except of very minor nature. Some of the requested surveys have been scheduled for 1953–54. In other cases the superintendent of schools or some other local staff member has decided to conduct his own survey or building-planning work under the guidance of the Survey Division staff. In a few cases, where the Survey Division staff already had a considerable understanding of the problem, it agreed to participate in one conference on campus after the superintendent had collected certain specified information. In other cases, the board of education decided that it could not wait and proceeded without assistance from the Bureau.

SUCH is the problem, but what of its solution? There are several measures possible, but no one of them alone is sufficient. The steps being considered are increasing the Survey Division staff and shifting more of the burden of surveys and building-planning projects to local school authorities.

The present staff of the Survey Division is made up of two full-time professors and a group of research assistants and secretaries. This year, a request for the addition of one professional

staff member was approved by the University administration for asking-budget purposes. However, the State Legislature must approve the request before any appointment can be made. At this writing, it is impossible to predict whether the request will be allowed. There are a great many conflicting valid requests that the Legislature must reconcile.

While the services of a third staff member are clearly needed, such an increase in staff will not wholly solve the problem. Our experience has shown that the making of a survey or the giving of assistance on a building-planning project in a given locality often is followed by several other requests from the same section of the state. This would suggest that an increase in the staff that would enable the Bureau to make more surveys would simply result in more requests.

It seems obvious that a part of the solution must be found in developing techniques to enable the local school authorities to carry more of the burden of conducting their own surveys and building-planning projects. Some progress has been made along this line, but this approach has not been systematically planned. Materials of the "workbook" type should be prepared for use in collecting and analyzing the essential data, and suitable instructions must be prepared for doing various parts of the work. With such materials, the local school authorities could carry a larger part of the total burden than is now the case, and at the same time they could have the assistance of the Survey Division in planning their study, in doing some of the more technical aspects of the job, in checking their work, and in formulating the recommendations.

As we see it, the issuance of such materials would have the additional advantage of making the local school administration more nearly able to cope with this class of local problem.

For the immediate future these possibilities seem to add up as follows: The Bureau of Educational Research will continue its efforts to increase the staff of the Survey Division. Whatever the outcome of these efforts, the Survey Division staff will take some time next year to develop materials which will enable local school authorities to carry more of the burden of their own building studies. This will inconvenience some boards of education, but in the long run will be to the advantage of many more. Finally, the Bureau will reappraise all the work of the Survey Division, in order to make its activities square with the most pressing school needs in Ohio.

EDITORIAL COMMENT

Wanted: Ability to Use Words Effectively

One of the greatest needs of many educators is ability to write well—to express their ideas effectively in English prose. In many cases, unfortunately, persons for whom this need is very great are unaware of it; it is not a "felt need."

It would, of course, be unrealistic to expect all educators to write with literary distinction. But it is not too much to expect that their exposition be clear and well organized and show a decent respect for the canons of good usage. Too many fail to meet these standards.

Writing, of course, is a highly complex art, requiring understandings, habits, and skills of many kinds. Hence there are many shortcomings that writers can have. It is my purpose here to discuss one fairly common fault of educational writers—their inability to use words and phrases with discrimination, precision, and economy—and to make suggestions for its correction.

This defect is not one which Rudolph Flesch and other writers on readability have been discussing. They are concerned with the length and familiarity of the words used, the average length of sentences, and so on. The work of these writers undoubtedly has made a contribution to the improvement of writing. But, as Fitzgerald has shown so brilliantly, it is easy to overemphasize the importance of their formulas.[1]

The failure to use words and phrases with discrimination, precision, and economy takes various forms. Sometimes it is the result of a fad; that is, the overuse and misuse of a term that has caught the popular fancy. "In terms of" is a good current example. Careless writers use it when they should use "in relation to," "in view of," "according to," or some other phrase. "In terms of" has its place, but it is now so badly misused that a writer should not use it without taking special care to see that it is the phrase he wants.

Another form of the trouble we are discussing is the erroneous use of figures of speech. Figurative language is necessary, of course, if writing is to have color and life. But its use requires special care if unintended and even ridiculous results are to be

[1] "Literature by Slide Rule," *Saturday Review*, XXVI (February 14, 1953), pp. 15–16.

avoided. For example, "The workaday world . . . can have a suffocating effect on one's perspective" contains a badly mixed metaphor; it is possible to limit or distort a perspective but not to suffocate it. "The objectives underlying the school's program . . ." is another example of the misuse of figurative language. Objectives are goals out in front that one is trying to reach; they are not underneath what one is doing.

One of the more common faults in using words and phrases is redundancy. "It is difficult, on an a priori basis . . ." is a case in point; "it is difficult, a priori . . ." says the same thing better. Similarly, "consensus of opinion" should be "consensus," as the dictionary makes clear.

Many of the errors of educational writers are not peculiar to them, but are widespread among other people. Many persons say "I am anxious to . . ." when they have no anxiety whatever about the matter under discussion; they mean "eager to." Members of a group cannot have "mutual problems," unless they themselves are problems to each other; what they mean when they use the expression is "common problems."

So much for some of the types of error in the use of words and phrases. What can a writer do to improve his command of words? The first thing, of course, is to get a "realizing sense" of his need for improvement. The next is to develop the habit of considering carefully the precise meaning of the words and phrases that he uses. If he has the opportunity to work with a person who is skillful in the use of words and phrases, he should take advantage of it. Practicing any art under the guidance of a competent critic is a most effective way of learning it. This is the way we learn to play the piano, paint, or diagnose disease.

Whether or not he works with an adviser on English usage, the writer should make constant use of the various aids that are available—the unabridged dictionary, dictionary of synonyms, thesaurus, and various other works on English usage. It is evident that some educational writers seldom or never use such aids.

There is one of these aids to good usage that deserves special mention. It is *ABC of Plain Words*, by Sir Ernest Gowers.[2] This is a sequel to *Plain Words*, both of which were written at the request of the British Treasury to help in improving official English. The present book, unlike the earlier one, is organized

[*Continued on page 140*]

[2] London: His Majesty's Stationery Office, 1951.

READINGS

Books to Read

DAVIDSON, ROBERT F. *Philosophies Men Live By.* New York: Dial Press, 1952. vii+484 pp.

A quotation from William James expresses the purpose of this volume: "To know the chief rival attitudes toward life as the history of thinking has developed them, and to have heard some of the reasons they can give for themselves ought to be considered an essential part of liberal education." These chief rival attitudes as the author presents them are: I, "The Pursuit of Pleasure"; II, "The Life of Reason"; III, "The Urge of Progress"; and IV, "The Compulsion of the Ideal." Out of the consideration of them comes "A Philosophy for These Times." Eight pages of suggested readings offer abundant material for filling the leisure hours of the inquisitive student.

Each of the rival points of view is illustrated by instances from the classic philosophers and from some more recent representative writer, who is not always a technical philosopher, but taken from some field akin in interest—journalism or religion. Thus the pursuit of pleasure was the primary motive in three philosophies: the popular hedonism of the Cyrenaics, Epicurus, and Lin Yutang; in an altruistic form in the hedonism of Bentham and J. S. Mill; and in a form which led to pessimism in the case of Schopenhauer.

The life of reason was the aim of the early rationalists, the stoics, the scientific rationalism of Spinoza, and the humanism of Walter Lippmann.

The urge of progress marks the radical naturalism of Nietzsche, the pragmatism of William James, and the naturalistic humanism of John Dewey.

The compulsion of the ideal is found in the rational idealism of Plato, the combination of idealism and rationalism of Aristotle, the moral imperative of Kant, and the Christian idealism of Reinhold Niebuhr.

A philosophy for these times will recognize that each of the tendencies considered has a certain truth in it; each is a perspective upon a truth that is more final than any, because it is more inclusive. Each view is presented in a calm and judicious way, and upon each is brought to bear a fair critical judgment, though the comments will not always be what the reader might make. The exposition is well balanced and accurate. The style is graceful and readable. The volume is the most attractive introduction to philosophy that has appeared for some time.

ALBERT E. AVEY

OLSON, O. JOE, editor. *Education on the Air: Twenty-first Yearbook of the Institute for Education by Radio and Television.* Columbus, Ohio: Ohio State University, 1952. viii+519 pp.

For more than twenty years the yearbooks of the annual Institute for Education by Radio and Television of Ohio State University have reflected the ideas of both commercial and educational broadcasters on every subject

from the operation of a 10-watt station to problems of international broadcasting.

Following on the heels of important developments in the field of television, including the nation-wide interest in the Kefauver Commission hearings, the proceedings of the Twenty-first Institute center on the problem child of mass communication—television. In this yearbook, then, we find hopes, fears, and predictions, foolish and wise as events may prove them to be, of broadcasters, educators, public figures, and just plain folks, as they talked about TV in 1951.

For example, we find Senator William Benton describing television as an "instrument which can transform and uplift human relations" (page 8). We read the comment of a successful commercial telecaster who estimated with regard to the Philadelphia political conventions, that "50 teachers could have talked for 15 hours each and the students wouldn't have learned as much about politics and conventions as from one day at the television set" (page 49). An educational broadcaster warns that "studies have already shown that television in the home does tend to affect the school grades of children" (page 71). And we hear the challenge to education sounded by Federal Communications Commissioner Frieda B. Hennock: "Since all TV channels are to be finally allocated by the Commission in the very near future, education's failure to obtain its proper share now would forever foreclose it from any substantial rôle in television" (pages 140–41).

Events have moved swiftly in the television field. Several more millions of sets have come into use during the past two years, and dozens of new problems have arisen. But in the more than five hundred pages of this yearbook basic issues are discussed which will remain as long as the air waves are in "the public domain," and as long as we seek to use radio and television for more than purposes of sheer entertainment.

ROBERT W. WAGNER

McGEHEE, FLORENCE. *Please Excuse Johnny.* New York: Macmillan Company, 1952. viii+242 pp.

This is a very readable book which seems light, but which proves very thought-provoking. The author begins by telling how, instead of becoming a supervisor, as she intended, she became a truant officer, "a hooky cop," in a California fruit- and vegetable-growing area. In a series of candid and apparently artless sketches, she tells of the people she met in the line of duty, the children and their families, and the economic and social situations which made school attendance difficult, or impossible, or irrelevant.

The little stories are told with sympathy and understanding warmth, and the author's sense of humor keeps herself and her job always in perspective, so that the real problems emerge clearly. The cumulative effect of the book is to make these problems seem to dwarf the means available for meeting them. However, it is not a gloomy book. There are charming pictures of children who rose above their backgrounds, and occasional sardonic jabs at smug "good families." All the stories ring so true that one wonders how the author can possibly have disguised them enough to continue in her job.

The reader may thank his stars that the schools of his community do not need to cope with migrants, happy-go-lucky Mexican families, Indians from

the reservation, and the other colorful characters that populate this book. The chances are, however, that the school population of any community would show fringe groups as varied and as little accepted as those sketched by Mrs. McGehee. She has posed in unusually readable form the perpetual problem faced by democracy's public schools, and people will do well to ponder her deceptively artless little book.

MARGARET WILLIS

CAMPBELL, CLYDE M., editor. *Practical Applications of Democratic Administration.* New York: Harper and Brothers, 1952. x+325 pp.

During the period of world-wide struggle between the concepts of democracy and authoritarianism, it behooves the American public school to support our way of life not only in the lessons taught by the teacher in the classroom but also by example in the way it conducts its affairs. In this setting it is a distinct service to disseminate any information which will help schools generally to be more successful in their efforts to democratize their practices.

The current volume is a symposium to which twelve Michigan educators contributed. The scope is broader than the title suggests, since only a little more than half of the pages are in chapters dealing with practical applications. The first and last parts, comprising six chapters, deal with the underlying theory, the implications for the preparation of educational leaders, and possible future trends.

The seven middle chapters, written by public-school administrators, describe the efforts made in several Michigan communities to apply the principles of democratic administration to solving a variety of school and community problems. The descriptions are interesting and provocative, but might have been improved by sharper focus on the democratic principles involved.

JOHN H. HERRICK

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Intelligent Teachers and Intelligence Tests—Do They Agree?

[*Continued from page 122*]

faced with such questions as: What accounts for the discrepancies between my judgments and the test results? How well do I really know the capabilities of my pupils? What means are available for improving my judgments of pupil intelligence? When evaluation becomes internal, when the teacher finds that he is focusing questions on himself, he is engaged in the process of self-evaluation.

Teachers' judgments of pupils are unquestionably not re-

stricted to the area of intelligence. Certainly teachers' opinions, usually expressed in informal talks with pupils, parents, teachers, or administrators, extend to the areas of personality, attitudes, interests, and the like. The accuracy of these judgments is, however, debatable. It seems to the writers that the method employed in this investigation could profitably be employed in similar studies in these areas. Such studies would involve comparisons between the subjective judgments of teachers and the objective results obtained from the use of various measuring devices. It is the writers' opinion that in these areas, as in the area of intelligence, the "sophisticated" judgments of teachers are much more reliable than is usually believed by both educators and laymen.

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Wanted: Ability to Use Words Effectively

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under headings alphabetically arranged. It is, therefore, handy for reference. Its clarity, common sense, and humor make it delightful, not only for reference, but as reading. Here is a typical example of how it deals with its subject-matter.

Bottleneck is a useful and picturesque metaphor to denote the point of constriction of something that ought to be flowing freely.

> Even if the manufacturers could obtain ample raw material, the shortage of skilled labour would constitute a bottleneck in production.

The metaphor is not new, but it has recently had a sharp rise in popularity, perhaps because our economy has been so full of bottlenecks. It needs to be handled carefully in order to avoid absurdity: it is necessary to remember that the most troublesome bottleneck is not the biggest but the smallest.

We can think of no better book with which to begin the job of improving one's English. Nor is this little book useful only to the beginner; on the contrary, it can be very useful to the person who already writes well.

We are convinced that, for many educators, the best approach to improving their writing is the one outlined here rather than the one played up by the writers on readability. It is more important to use words with precision than to use short words or words of Anglo-Saxon origin. Long sentences are not as great a defect in writing as the inaccurate use of words and phrases.

R. H. E.